DOCUMENT RESUME

ED 350 990 IR 015 803

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TITLE Hypermedia, Multimedia: What's Going On in Today's Classrooms?
PUB DATE 92
NOTE 8p.
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Databases; Electronic Publishing; Elementary Secondary Education; *Hypermedia; *Microcomputers; Research Reports; *Student Developed Materials; *Student Projects; Yearbooks
IDENTIFIERS HyperCard; HyperScreen; *Multimedia Materials

ABSTRACT

Definitions and discussions of the terms hypermedia and multimedia are followed by discussions of three different ways in which schools are using multimedia: multimedia produced by publishers for use in elementary and secondary classes; teacher developed multimedia and hypermedia for use with students; and student created multimedia compositions. Three examples of student hypermedia projects in the Baker Demonstration School at National-Louis University are given: (1) The Hypermedia Zoo--a project using HyperCard with seventh graders to produce multimedia research reports; (2) Quilts, Ocean Animals and Africa--three multimedia projects with third graders using HyperScreen to create a quilt, create an imaginary animal based on research on specific ocean animals, and student initiated use of HyperScreen to make a stack about Africa; and (3) A Multimedia Yearbook--eighth graders using HyperCard to publish a yearbook on disk. (ALF)

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Hypermedia, Multimedia: What's Going on in Today's Classrooms?

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Attend any educational conference this year and you are likely to encounter sessions and exhibits on hypermedia and multimedia. Examine budget requests at your local school, and you will see teachers requesting videodisc players, laser bar code readers, compact disc players, graphics scanners, digital cameras, video digitizing hardware, and lots of software and videodiscs. What *are* hypermedia and multimedia and how are they being used in today's classrooms?

Hypermedia

Hypermedia is a new kind of software, a unique information environment. You can use it to look for and store information, but the term "information" refers to a lot more than words--it includes charts, pictures, scanned images, sound, music, animation and even video. In hypermedia, any piece of information can be linked to any other piece of information, creating a web of related ideas. You can jump around electronically within this body of information, following particular tangents that reflect your interests and bypassing other information you deem irrelevant.

In printed media such as books and magazines, text and pictures are organized sequentially with one topic following another. In hypermedia, however, information is organized the way most people think, by association and context. Ideas and concepts can be linked to related ideas and concepts. Different people exploring the same body of information are likely to follow different paths, depending on their individual interests and objectives.

Hypermedia lends itself well to educational applications. In learning a new concept, we often compare one idea to another, build analogies, and make connections to other information we already understand. A hypermedia environment mirrors this process,

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allowing users to navigate easily through large amounts of information making such associations. Hypermedia software is available for a variety of different computers: HyperCard for the Macintosh, HyperStudio and HyperScreen for the Apple IIGS, and Linkway and Toolbook for MS-DOS computers.

Multimedia

The term multimedia has been around a long time, long before computers. Today, however, it is usually used to describe the integration of text, graphics, animation, sound, video, and music under computer control. The computer is the heart of the multimedia system. Connected to the computer are peripherals that show video and play music, typically a videodisc player and a compact disc player. In interactive multimedia, you are not a passive viewer and listener--as you are when you are watching a film or listening to a musical recording--but an involved and active participant. As a participant you can browse, explore, make notes, add new information, perhaps even create new things. Hypermedia software is usually used to integrate the different forms of media because it allows you to choose what to view and hear and in what order.

Multimedia in Schools

Schools are using hypermedia and multimedia in three distinct ways. First, a number of publishers are developing multimedia materials for the elementary and secondary classroom. Usually the materials include a videodisc or compact disc, hypermedia software to control the disc, and curriculum materials. Second, teachers who are familiar with hypermedia and multimedia are developing their own materials for their students to use. Third, students at many grade levels are learning to create their own multimedia compositions.

Although research on the use of multimedia in schools is still in its infancy, findings from the field of cognitive psychology indicate that multimedia is likely to enhance learning to the extent that it is interactive, multisensory, and emphasizes the importance of making links among ideas. First, unless people become engaged in a task, they will not

learn from it. Long-term understanding requires active, prolonged engagement in which the learner seeks out and manipulates information. Multimedia that is interactive encourages the active involvement of the student and thus enhances learning. Second, materials that are multisensory are more effectively remembered. In particular, the use of visuals--charts and diagrams as well as films and photographs--has been shown to enhance learning consistently. Third, research in cognitive science emphasizes the importance of making links among concepts. Our minds make an enormous number of connections among the facts we learn. We cannot really know anything until the mind breaks it down and categorizes it and relates it to the other things we know. Multimedia materials that make explicit to learners the interrelationship of ideas should enhance their learning.

In addition, children who are used to watching television, listening to music, and playing computer games find multimedia a more compelling and motivating learning environment than traditional chalk and talk. Those students who have difficulty expressing their ideas in writing have a new way to communicate, and those who have difficulty reading have a different medium in which to learn.

On the following pages are three examples of student hypermedia projects in the Baker Demonstration School at National-Louis University. Similar projects are occurring in schools all over the country.

The Hypermedia Zoo

Seventh-graders at the Baker Demonstration School have been using HyperCard on the Macintosh to create multimedia research reports about mammals as part of their science curriculum. During four field trips to the zoo each student observed, recorded, and illustrated the physical characteristics, locomotion, and behavior of a specific mammal. Then they determined what information should be included in their report, organized it into screen-sized chunks or cards, and linked the cards of information in a meaningful way. They used a graphics scanner to scan a picture of their mammal into their HyperCard

report, a microphone connected to the computer to record their own voice, and a videodisc player to access a motion sequence of their mammal in its natural habitat.

Vito Dipinto, the middle school science teacher at Baker, talks about the Hypermedia Zoo project: "The study of mammals has been an integral part of my seventh grade science curriculum for four years. In the past students selected a mammal to observe at the zoo and presented the results of their observational research in a traditional written form. But since hypermedia is a very different medium for organizing and communicating information, I thought it might empower students to be better communicators and to think differently about how to organize information. One of the first things I noticed is that the students made an enormous number of spontaneous text revisions using HyperCard. With traditional written reports, students usually made revisions only after I corrected their drafts. In HyperCard, however, the space limitations of the card required the students to determine what information was relevant and then edit it to fit. One of the students said it was easier to write in HyperCard because she could write in chunks rather than in one long stream of text. Several of the students have since chosen to do reports for other classes in HyperCard, so they are applying what they have learned to other contexts.

"Another benefit of HyperCard over traditional written reports was that they could use the graphics scanner and the videodisc. Scanning gave them the capability to illustrate what some couldn't do as well by drawing or tracing or even photocopying. They could use the painting tools to edit what they had scanned and you can't do that with a photocopy. And the videodisc was a medium that they couldn't use at all with a written report. They had to make choices about the best still frame and the best motion sequence to illustrate their mammal. Some students even revised what they had written about their mammal's locomotion after seeing the mammal on the videodisc in its natural habitat.

"I think that the students have better synthesis skills now. I don't normally teach in a linear way. I introduce lots of ideas in individual strands and then try to help students synthesize them. Since the hypermedia unit, I've had to do less of the synthesizing for

them. The hypermedia mode of thinking seems to have transferred to the habitat unit that we are studying now. The students are making the connections."

Quilts, Ocean Animals and Africa

The third graders in Jane Moore's class at Baker Demonstration School used HyperScreen on Apple IIGS computers to create designs for a quilt. Moore said she started using hypermedia with her students last year so they would have another form of communication, another way of expressing themselves other than pencil and paper. But of course, the students had to learn the skills of using the software before they could use it as a tool to communicate. Although learning the computer skills involved more time than Moore expected, she has no doubts that the benefits are worth the time.

In their first project, the students selected clip art and wrote text in pop-up windows to introduce themselves to parents at the school's open house. As a result, the parents were introduced to hypermedia as well as to the students in their child's class. In the next project Moore encouraged the students to use the painting tools in HyperScreen to draw their own pictures rather than using clip art. Based on last year's experience, Moore decided to allow the children plenty of time for free exploration so that they would know the capabilities of the software and be comfortable with it. A tool only becomes personally useful when you have figured out how it works and can concentrate on the task you want to use it for. Since the class was studying quilts at the time, Moore asked the students to design in HyperScreen a square for a classroom quilt. Each student printed his or her square on a color dot matrix printer with a heat transfer ribbon. Then Moore ironed the printed pictures onto cloth squares and sewed them together into a quilt. That quilt is now displayed in their classroom.

Moore has continued to plan hypermedia projects that are specifically linked to the third grade curriculum. During a month-long unit on the ocean and ocean animals, the third graders used what they had learned about the characteristics of ocean animals and applied that knowledge to create a new imaginary animal. After each student researched

information about a specific animal, Moore pulled names out of a hat to pair students together. The pair had to create a new imaginary animal combining some of the characteristics of each of their animals. For example, the two students who studied oyster and penguin created an animal they called an "oysguin." They made a HyperScreen stack describing an "oysguin" and drew a picture of it. They worked together to design and link their stack. The computer facilitated collaboration because both students could easily see the computer screen and talk about the work in progress. Moore said she knew the students had appropriated the computer as a tool when they were studying a unit on Africa and the students themselves suggested that they use HyperScreen to make a stack about Africa.

When asked about the benefits of using hypermedia in her classroom, Moore said, "I get to see a creative side of kids that I don't see with typical classroom activities. One boy, for example, drew a circular shape for his imaginary ocean animal and wrote below it "orb." I realized he knew a lot more than I thought he knew. It gave me a new view of the child."

A Multimedia Yearbook

Under the direction of Bonnie Thurber, the eighth graders in Baker Demonstration School are publishing a multimedia yearbook using HyperCard on the Macintosh. When it is finished, every student will be able to take home a copy of the yearbook on disk. The multimedia yearbook doesn't replace the printed yearbook that the parents publish for the class, but it is much more personal. Students are in charge of every step of the publication.

The students were already familiar with HyperCard because they had learned it as seventh graders when they did their mammals project in science. This year they learned more about HyperCard programming and used more sophisticated equipment. Each eighth grader designed a card with four pop-up text fields which tell different things about themselves. Using the computer's microphone, they were able to introduce themselves in their own voice. They used a Canon XapShot camera to take pictures of each other for

their stack. Instead of using film, the XapShot camera records images on a small floppy disk inserted into the camera. One disk holds up to fifty images and is re-useable. Since there is no film to be developed, students are free to experiment by taking many pictures. The pictures can be viewed immediately by attaching a cable from the camera to a color monitor or television. The students then imported the pictures directly from the camera into HyperCard using ComputerEyes video digitizing hardware and software.

Several students accepted editing responsibilities. They looked at each card to test the buttons, pictures, sound bites, and pop-up fields and to check spelling. Another student was responsible for merging all the individual one-card stacks into one class stack and linking them. Another student will make copies of the stack on individual disks for the class members to take home.

In the future, Thurber would like to be able to record on videotape a screen by screen tour of the stack so that students who don't have a Macintosh at home will be able to view it on a VCR. She also plans to use the XapShot camera to take pictures of school events throughout the school year to include in future editions of the multimedia yearbook. With a video digitizing card called VideoSpigot, students will even be able to use a camcorder to videotape action shots around the school and import brief video clips directly into a special window in HyperCard, something they certainly can't do in a printed yearbook.